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ABSTRACT

Seniors in Broward County (Florida) public and private high schools were compared on the basis of 1970-1971 statewide test results, with comparisons made of how well students were achieving in terms of their capabilities as measured by the verbal and quantitative aptitude sections of the statewide battery. Some of the findings were that: 1) Achievement in English and science was essentially the same among public and private school seniors; 2) Private school students with superior verbal and quantitative aptitude scores did better than equally able public school students on the social studies test and the math test; 3) Public school students with low aptitude scores did better in each area; 4) Students with average aptitude did about the same in both types of schools. Comparisons were also made with scores of students attending a specific public high school, Nova High School, which had been the subject of a Ford Foundation study, and the Nova students generally did better than the private students. In all, the findings did not indicate any major differences between the test scores of public and private school seniors. Graphs illustrating the findings comprise half of the report. (Author/LH)

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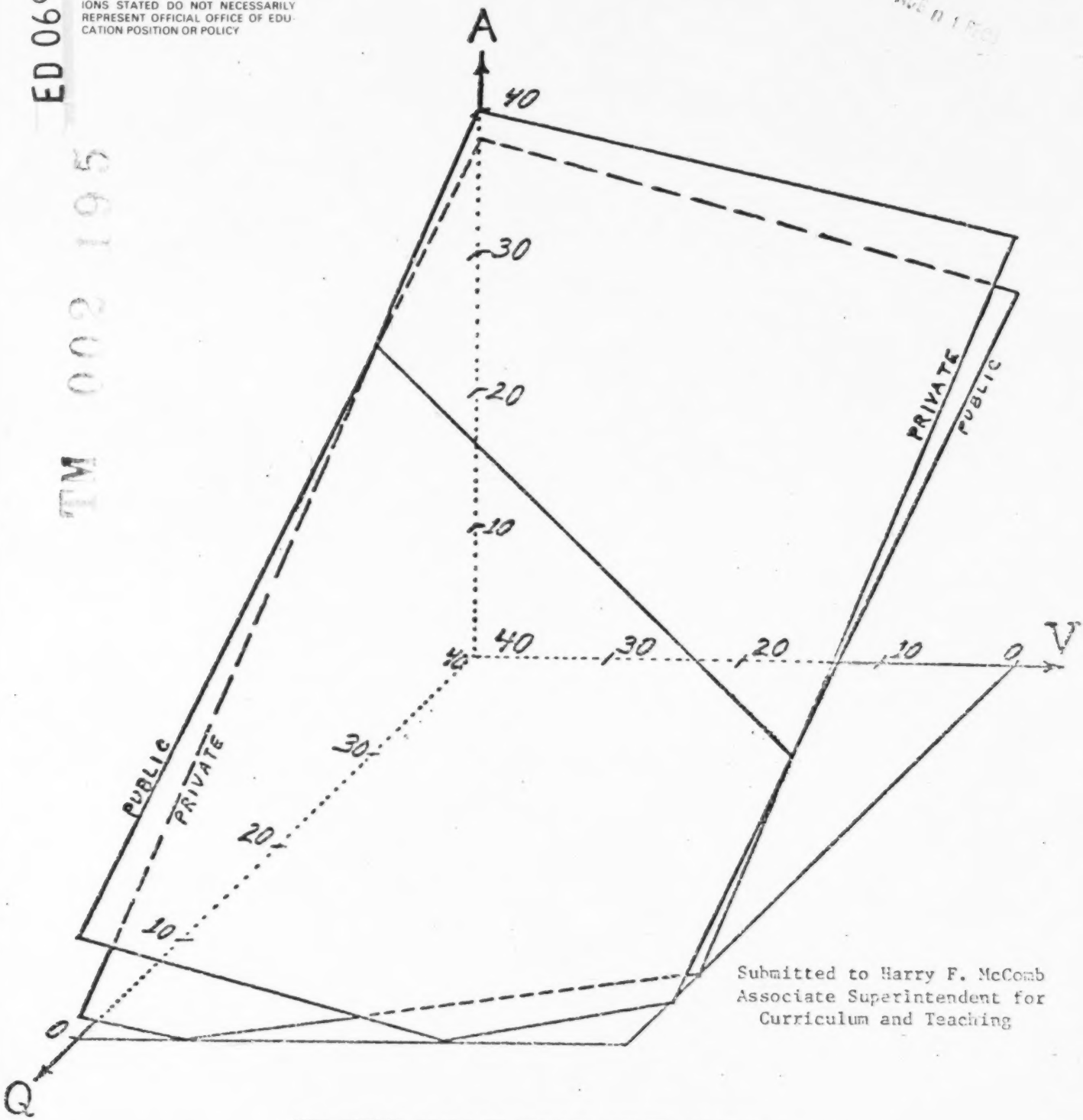
BROWARD COUNTY SENIOR TEST RESULTS IN PUBLIC AND PRIVATE SCHOOLS



Submitted to Harry F. McComb
Associate Superintendent for
Curriculum and Teaching

THE SCHOOL BOARD OF BROWARD COUNTY, FLORIDA
Benjamin C. Willis, Superintendent

Research Department
Report No. 46

ABSTRACT

Seniors in Broward County public and private high schools, as well as Nova High School, were compared on the basis of 1970-71 statewide test results.

The comparisons were made on the basis of how well students were achieving in terms of their capabilities as measured by the verbal and quantitative aptitude sections of the statewide battery.

It was found:

1. Achievement in English and science was essentially the same among public and private school seniors.

2. Private school students with superior verbal and quantitative aptitude scores did better than equally able public school students on the social studies test. Students with low aptitude scores did slightly better in public schools. Students at middle levels of aptitude did about the same in both types of schools.

3. Private school students with high quantitative aptitude scores scored higher on the math test than their intellectual counterparts in public schools. Students with low quantitative aptitude scores did better in public schools. Students with average quantitative aptitude scores did not differ by much in either type of school.

4. Nova seniors scored higher than private school seniors on the social studies and math tests.

5. Nova seniors with high verbal aptitude scores scored higher than their counterparts in private schools on the science test. This advantage decreased at lower levels of aptitude scores. Since Nova had few students with low aptitude scores, the majority of Nova students outscored private school pupils of similar aptitudes on this test.

6. There was no difference between Nova and the private schools on the English test.

The findings did not indicate any major differences between the test scores of public and private school seniors.

PREFACE

The notion that public schools in Broward County don't show up well on standardized tests seems to be rather widely accepted. On most achievement tests at most grade levels the county falls below publishers' norms.

What has not been emphasized, however, is that the county also usually falls below these comparison groups on aptitude or intelligence tests, as well as on achievement tests.

Aptitude and/or intelligence tests are supposed to measure what students are capable of doing, rather than how well they are actually achieving. In using test scores to evaluate how well a total school system is doing, it is appropriate to consider how well students are achieving in terms of their capabilities, rather than on an absolute basis. In other words, scores on aptitude or intelligence tests should be taken into account in assessing scores on achievement tests.

Over the past few years the absolute achievement of public school pupils in Broward County has been overemphasized. There has been a tendency to overlook or overestimate scores on measures of aptitude and intelligence. Two reports were released during the 1970-71 school year which attempted to encourage an awareness of the need to look at achievement test results from the perspective of pupil capabilities.

One of these reports concerned California test results from the 1969-70 school year at the third, fifth, eighth, and twelfth-grade level.* In that report it was emphasized that the norm group with which the county was being compared scored well above average on the IQ test used in conjunction with that battery of achievement tests. Unfortunately, the county did not use the same IQ test, so comparisons could not be reported. The county switched IQ tests for the 1970-71 school year, so such comparisons will be made available in the next report of California test results.

The second report was based upon statewide test results for the 1970-71 school year at the ninth- and twelfth-grade levels.** That report did take aptitude results into account. It showed that Broward pupils were achieving essentially the same at all levels of aptitude as were students of comparable abilities in the state as a whole. It also mentioned that on the one test for which national, rather than Florida norms were available, the county and state fell considerably below the norm group. It is noteworthy that this was an aptitude rather than an achievement test.

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* See Testing Report Presented to The School Board of Broward County, Florida in the conference session October 14, 1970.

** See Report No. 42, Statewide Testing Program.

These two reports have not received as much publicity as news releases which emphasize the absolute gaps between the county and various norm groups on achievement measures. The reports did not paint a glowing picture of student achievement in Broward County. They did demonstrate that the situation was not as dire as some people seem to have assumed. It will obviously take time and subsequent reports to develop a new and deeper public consciousness regarding the interpretation of local test results. It is to be hoped that this report will contribute to the attainment of this goal.

INTRODUCTION

Last fall this department secured a computer tape summarizing the test scores of all seniors in the state who participated in the 1970-71 statewide testing program. The tape was obtained so as to provide local educators with direct and accurate comparisons of achievement in this county as opposed to elsewhere in the state. Part of the purpose in getting the tape was to add to it census data and other types of information in order to do some in-depth contrasts between achievement in Broward County and other counties in the state. The tape already contained information identifying test results by types of schools, public or private. It was thought that contrasting public and private school test results might be one type of in-depth analysis which could be performed.

Departmental intentions regarding possible uses for the tape were gathering dust in the press of other matters, when they were reactivated by news releases concerning test results obtained by seniors in South Florida parochial schools. Some of the comments which appeared in local newspapers following the disclosure of parochial school test results demonstrated the all too prevalent habit of looking at pupil achievement on an absolute basis and then drawing conclusions about the productivity of the public school system.*

Since information concerning public and private school test scores was available, it was felt that it would be timely to take an objective look at the achievement of public and private school seniors in Broward County on a comparative basis. The important element in these comparisons was that achievement be looked at in terms of pupils' capabilities. The ultimate purpose of this report is to demonstrate that simple comparisons of test scores on an absolute basis do not constitute a truly critical and objective appraisal of a school system.

PROCEDURES

In securing the statewide testing tape, the department incurred an obligation not to reveal the names of schools or counties other than

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* See, e.g., the comments regarding parochial school test results in the editorial section of the Fort Lauderdale News for July 10 and July 15, 1971.

Broward public schools in any reported analyses. Because parochial schools had already released scores to the media, there seemed to be no good reason for not analyzing these results in comparison to the public schools in Broward County. However, all nonpublic schools in Broward County are not parochial schools. It was decided that the best possible comparison would include scores obtained by seniors in all nonpublic schools in Broward County. Prior to making any analyses, the proposed project was outlined to Dr. McQuitty in Gainesville. This was done in order to be certain that the study was an acceptable use of the information he had provided. After receiving a telephoned acceptance of the project from his office, the analyses were made.

All seniors in nonpublic schools in Broward County who had scores on the two aptitude and four achievement tests which comprised the statewide test battery were used in the analyses. A systematic random sample of seniors with complete test data in all Broward County public schools was drawn for purposes of comparison. Students were listed alphabetically and every eighth name was selected.

This procedure resulted in a sample selection which differed slightly from county averages in the previously released report of these test results.* In all cases, the average scores in the sample were lower than reported for the total county. This slight loss in accuracy was more than compensated for in that the statistical programs used in the analyses are not geared for thousands of cases. Without getting technical, it can be said that most statistical procedures break down from the standpoint of relevance when applied to large quantities of data. Statistical tests become sensitive to differences which are too small to be of any practical importance as the number of cases in a study increases beyond a few hundred. There were too many cases in the following analysis to place much practical weight in statistical tests, but not so many as to render the tests completely irrelevant.

A third group used in the study included all Nova seniors with complete test data. Because the county sample included Nova pupils, separate comparisons had to be made of the private school group against the county as a whole and against Nova. The Nova comparisons were included because it has apparently not been widely recognized that the academic achievement of Nova pupils in relationship to their ability has improved considerably since the completion of the Ford Foundation study of that school. It was also felt that Nova served a student body more comparable to the private schools than did other public high schools in the county.

RESULTS

Actual Mean Scores

The mean scores actually obtained by the three groups in the study are summarized in Table 1. Scores are expressed as raw scores (the number of items correctly answered on each test).

* Report No. 42, op. cit., p. 2.

Table 1

Means and Standard Deviations

		Verbal Aptitude		Quantitative Aptitude		English		Social Studies		Natural Science		Math	
Schools	No.	Avrg	SD	Avrg	SD	Avrg	SD	Avrg	SD	Avrg	SD	Avrg	SD
Private	790	32.9	8.0	28.2	7.9	53.6	12.4	37.8	10.9	28.4	8.9	27.1	10.4
Public	775	27.0	9.3	24.1	8.1	46.2	13.4	31.2	11.1	24.5	9.3	22.5	10.1
Nova	351	34.0	7.8	29.3	7.6	55.1	11.4	40.3	10.7	31.3	9.4	30.0	10.9

Particular attention should be directed to the aptitude scores displayed in Table 1. It is evident that pupils in private schools scored higher on the aptitude tests than the public school sample. Nova students obtained higher aptitude scores than did students in the private schools.

The standard deviations are measures of how much variability there is within a group. High standard deviations indicate that there is considerable difference in scores within a group. Low standard deviations indicate greater homogeneity of scores within a group.

One would expect the standard deviations for public schools to be greater than for private schools because public schools may be assumed, on the whole, to serve a less homogeneous group of pupils. This expectation was fulfilled on all tests except math. Nova appeared to be serving a pupil population which was more homogeneous than the other two groups on all tests except math and natural science.

Confining attention to the aptitude tests, it can be said that the public school students represented a more divergent group in terms of ability than pupils in private schools. Nova represented the least divergent group. Students at Nova did not differ as much from each other in ability as did students in private schools or the county as a whole.

Achievement in Relationship to Ability: Public vs. Private

English: The following charts depict differences in achievement between public and private schools at comparable levels of verbal and quantitative aptitude. The lines on the charts can be regarded as trend lines which could be used for predictive purposes. Scores on one of the four achievement tests are plotted on the vertical axis of each graph. Scores on the verbal aptitude test make up a common horizontal baseline for each graph. Plotting scores on quantitative aptitude would require a third axis and this presentation is confined to two dimensions.* Therefore, it was decided to plot four separate raw score points on the quantitative aptitude continuum corresponding roughly to low, low-average, high-average, and high quantitative aptitude. Trend lines for the public and private schools were plotted on the graphs for each of four quantitative raw scores: 10, 20, 30, and 40. The scores of most pupils ranged between 10 and 40 on both aptitude tests.

* One three-dimensional representation has been appended for the benefit of readers with a good grasp of spatial relationships.

Looking at the first chart, one could say that a student with a verbal raw score of 10 and a quantitative raw score of 10 would be predicted to score about 24 on the English test. A student with a verbal raw score of 10 and a quantitative raw score of 40 would be predicted to score about 34 on the English test. It should be easy to see that as verbal and quantitative aptitude scores increase, predicted scores on the English test also increase.

It should also be obvious that the difference in the trend lines for private and public schools at each level of verbal and quantitative aptitude is very small. Private school seniors would be expected to answer correctly about .31 of an item more than public school seniors of similar abilities.

The separate trend lines for the two groups were not really quite as parallel as those shown in this chart. It is conventional to statistically test whether such lines can be regarded as essentially parallel. They can be plotted as parallel if the statistical test is not significant. Parallel trend lines mean that students in the two groups differ by the same amount at all levels of both verbal and quantitative aptitude.

In cases where trend lines can be depicted as parallel it is customary to test the constant difference between groups for statistical significance. In this case, the students in private schools were superior by a constant difference of .31 of an item over public school students with the same verbal and quantitative aptitude scores. The statistical test of the .31 difference would indicate whether or not such a difference was large enough to indicate that the groups really represented two separate populations. A nonsignificant difference would indicate that the scores didn't differ enough to justify saying there were really two different groups on the basis of test score distributions.

The difference of .31 of an item on the English test was not large enough to be of statistical significance. Since these analyses are based upon a relatively large number of cases, statistically significant results could be obtained for differences too small to be of much practical importance. Thus, the fact that the difference on the English test is not statistically significant is a good warrant that it is of no practical significance either. This fact should have been conventionally portrayed on the graph by drawing only one common trend line for each of the aptitude coordinates and not distinguishing between public and private schools. Knowing a person's verbal and quantitative aptitude scores was sufficient to estimate his English score from a predictive standpoint. One could not predict his English score with significantly greater accuracy if one also knew whether that person attended a public or private high school. To avoid confusing the reader and to show graphically how minute the difference really was, separate lines were plotted for the two types of schools.

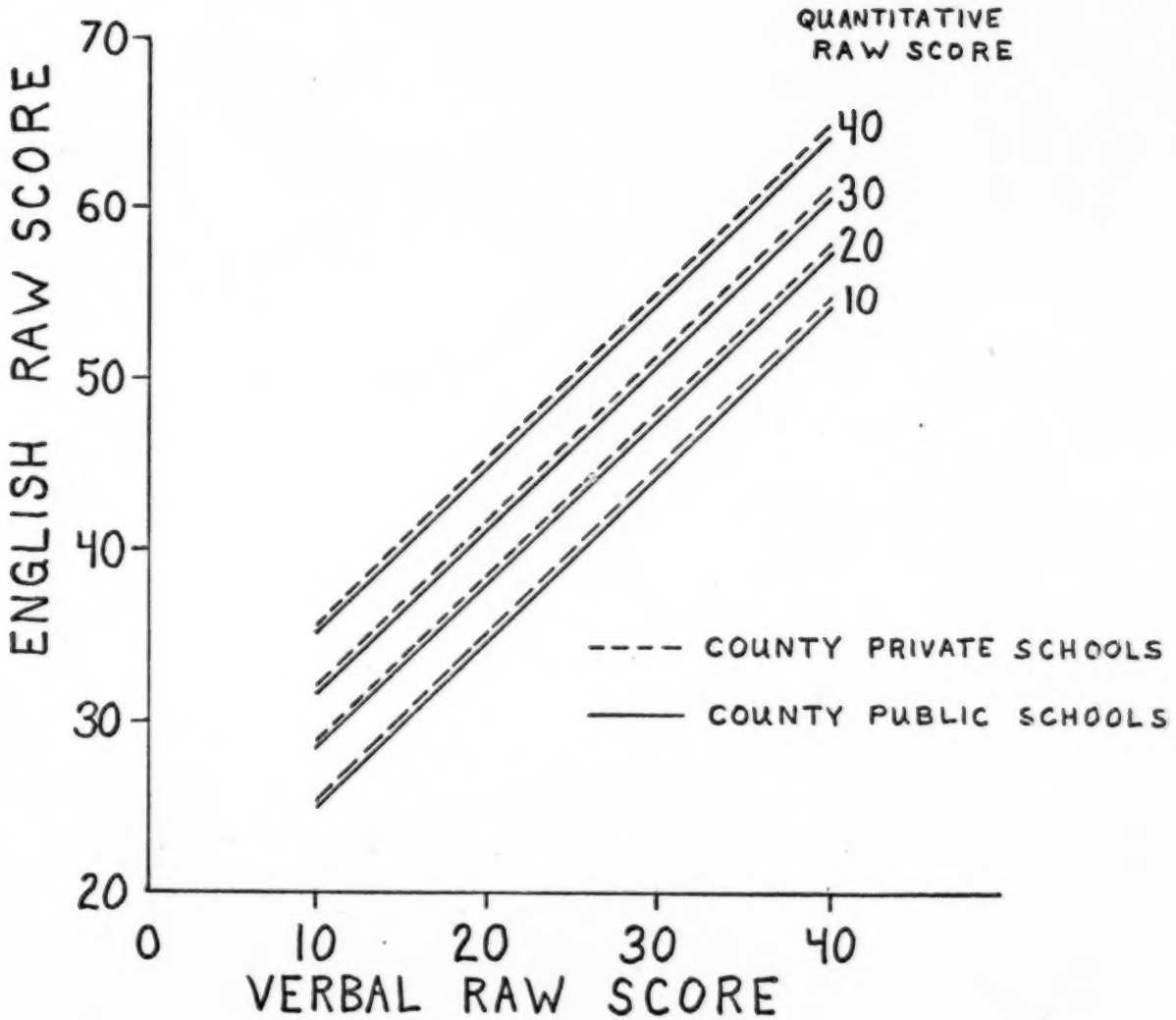
Social Studies: The second graph, which depicts social studies achievement, is a little less clear-cut. The test for parallel trend lines was statistically significant. This means that how well students in public schools did as compared to students in private schools depended in part upon their verbal and quantitative aptitude scores. A glance at the chart shows that pupils with quantitative scores of 40 did better in

private schools. Notice that the trend lines favor private schools as both quantitative and verbal aptitude scores increase. The greatest superiority of private over public schools on social studies depicted on the chart was among pupils with verbal and quantitative aptitude scores of 40. This difference amounted to 2.03 items. As quantitative and verbal scores decrease, the differences between public and private school pupils become much smaller. Students with verbal and quantitative aptitude scores of 20 and below tended to do slightly better in public schools.

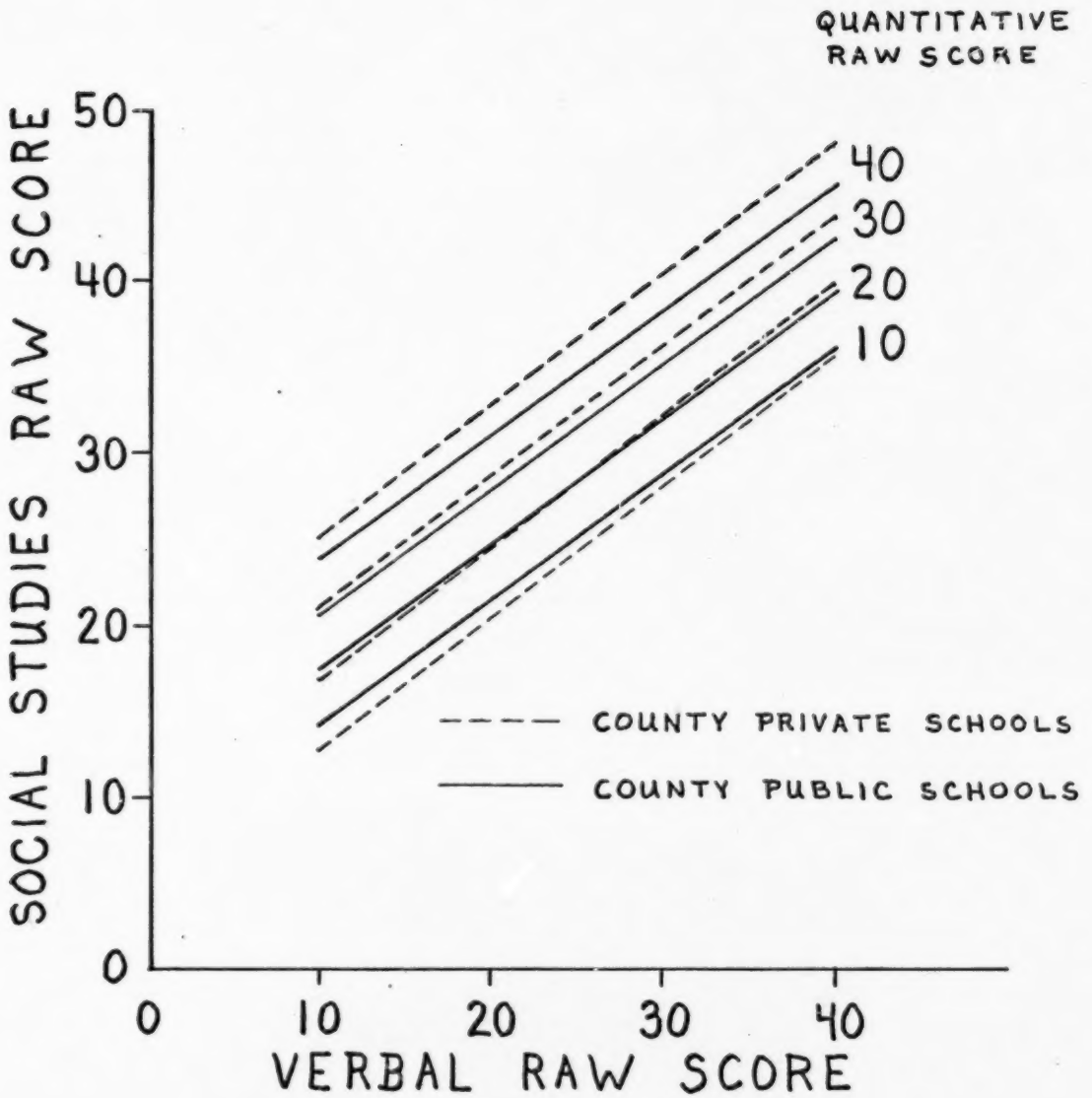
Because differences between public and private schools varied by aptitude levels, no one test of statistical significance can be made to estimate the importance of these differences. It seems reasonable to conclude from an inspection of the chart that private school students with superior verbal and quantitative aptitude scores did better than their intellectual peers in public schools on the social studies test. Students who were less able did a little better in public schools, although this difference was probably too small to be of practical importance. After making the above qualifications, it seems reasonable to conclude that at most levels of aptitude, public and private school pupils did about the same on the social studies test.

Natural Science: The parallel lines on the graph indicate that the difference between public and private schools was about the same, regardless of differences in pupils' verbal and quantitative aptitude scores. The public schools had a slight edge on this test which amounted to getting an average of .64 more items correct. The statistical test of the significance of this difference approached, but did not reach, conventional levels of accepting the difference as being significant. That the difference approached statistical significance is probably more due to the number of cases than to any practical superiority of public school seniors. The remarkable closeness of the two groups on the English and natural science tests is attested to by the fact that these overly sensitive statistical tests were nonsignificant. For all practical purposes, the two groups can be regarded as doing the same on the science and English tests. Since most students fell at the middle ranges of aptitude, the majority of pupils in public and private schools also didn't differ by much on the social studies test.

Math: The patterns of scores on the math test indicated the greatest differences between public and private school pupils. Students with high quantitative aptitude scores fared better in private schools. This advantage decreased a little as verbal aptitude scores increased. Pupils with high quantitative and low verbal aptitude scores did best in private schools. Conversely, students with high verbal but low quantitative aptitude scores did best in public schools. For pupils with quantitative aptitude scores of 40 and verbal aptitude scores of 10, private school pupils averaged 3.57 more items correct. For pupils with quantitative scores of 10 and verbal scores of 40, the difference was 4.08 items in favor of public school pupils. However, it should be pointed out that very few pupils would actually score extremely high on one of the aptitude tests and extremely low on the other. The upper righthand portion of the trend lines for pupils with quantitative aptitude scores of 40 are much more likely to include a sizeable number of pupils than the lower lefthand corner. This is because the righthand corner also represents high



1970/71 TWELFTH GRADE STATE-WIDE TEST RESULTS FOR BROWARD COUNTY PUBLIC AND PRIVATE SCHOOLS IN ENGLISH ACHIEVEMENT AS A FUNCTION OF BOTH VERBAL AND QUANTITATIVE APTITUDE.



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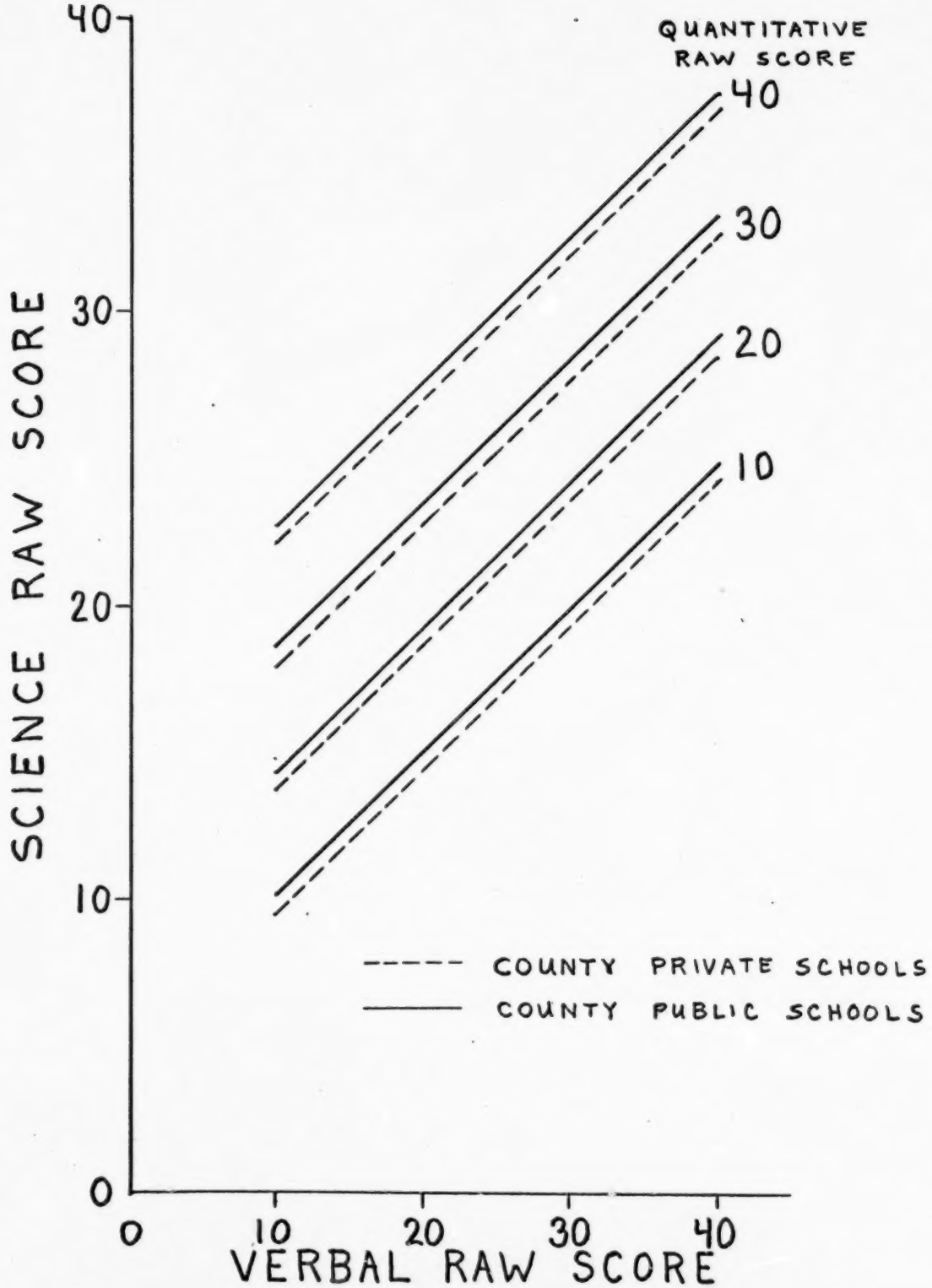

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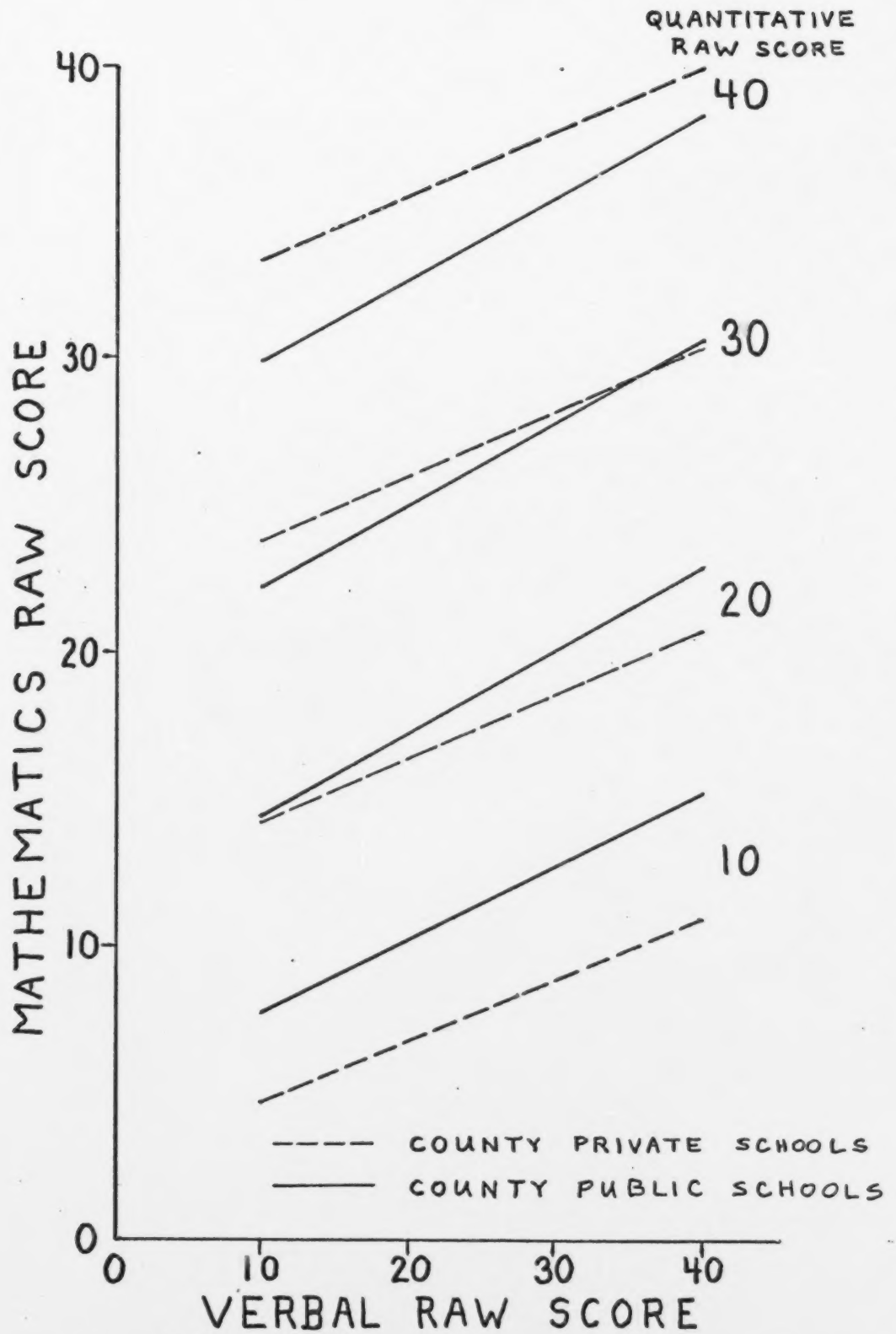


1970/71 TWELFTH GRADE STATE-WIDE TEST RESULTS FOR BROWARD COUNTY PUBLIC AND PRIVATE SCHOOLS IN MATHEMATICS ACHIEVEMENT AS A FUNCTION OF BOTH VERBAL AND QUANTITATIVE APTITUDE.

verbal aptitude scores. The central portions of the lines plotted for quantitative scores of 20 and 30 are more relevant than the extreme ends. The lower lefthand segment of the lines for quantitative aptitude scores of 10 are more significant than the upper righthand corner.

Study of the graph indicates that differences in quantitative aptitude have a greater effect upon the trend lines than do differences in verbal aptitude. It seems safe to conclude that pupils with high quantitative aptitude scores did best in private schools. Pupils with low quantitative aptitude scores did best in public schools. Students with average quantitative aptitude scores did about as well in either type of school.

Summary: The findings do not indicate any major differences between public and private school seniors of similar capabilities. At most, the evidence indicates that a minority of talented private school pupils did better on two tests than equally talented public school pupils. It may also be said that a minority of less capable public school pupils did better on one or possibly two tests than their counterparts in private schools. These differences might reflect adaptations of academic programs to best suit the needs of the two different aptitudinal extremes most likely to occur in the two types of pupil populations.

These differences, however, are far less salient than the overall similarities of performance among public and private school pupils. It certainly appears that the majority of pupils did about as well in either type of school. If scores obtained by local public school students reflect serious educational problems, then the same sort of thing can be validly said of the private schools. As a previous report on these test results indicated, county public school test scores were very nearly identical to those obtained by pupils of similar abilities in the state as a whole.* If test results can be taken as a valid indication of educational performance, public and private schools in Broward County and public schools in the state as a whole would appear to be in about the same boat.

Achievement in Relationship to Ability: Nova vs. Private Schools

English: The parallel trend lines show that achievement differences were the same at all levels of aptitude. The difference between Nova and the private schools was a microscopic .07 items correct. This difference is of no significance in any sense.

Social Studies: On the social studies test the parallel lines attest to the absence of differential effects between the two groups which were dependent upon aptitude levels. The constant difference between the groups was 1.21 items correctly answered. The difference is statistically significant. It can be said that Nova pupils scored slightly better than private school pupils of comparable ability on this test.

* Ibid.

Science: The criss-crossing lines on the science graph indicate that comparisons of the two groups were dependent upon the aptitude levels of pupils. The quantitative aptitude scores seemed to have little effect upon these group differences. Nova pupils with high verbal aptitude scores did better than their counterparts in private schools. For scores of 40 on both aptitude tests, this difference amounted to 2.81 items.

Math: The parallel lines on the graph indicate that school differences did not depend upon aptitude differences. Nova students at all aptitude levels scored 1.57 items higher than similarly capable private school pupils. This difference is statistically significant.

Summary: The trend lines for social studies and math suggest that the performance of Nova students on these tests was slightly higher than that of students of like abilities in private schools. This was also essentially true of science, although the lines cross, because most Nova students actually made high verbal aptitude scores. In English there was no difference between the groups.

LIMITATIONS AND CONCLUSIONS

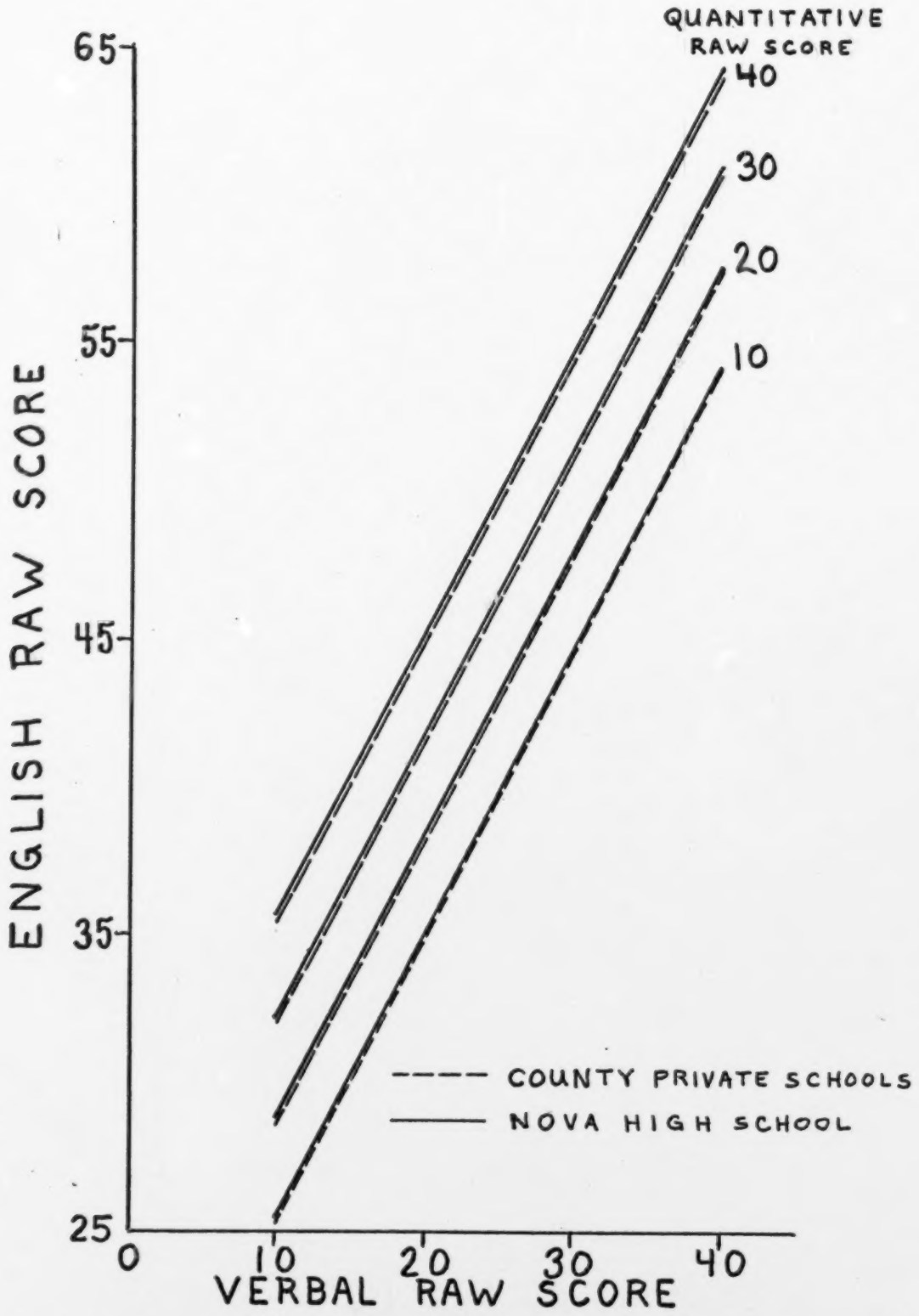
There is really no completely satisfactory way to separate the influence school factors such as instructional programs, plants and facilities, and teachers, have upon test results from the decisive effects other factors such as hereditary and family background, have upon these results. Studies such as this one cannot, therefore, provide final answers concerning which type of school program is doing the best job with pupils.

Using aptitude scores to provide a common baseline for comparisons does not solve all the problems of controlling for factors which lie outside the influence of school factors. For one thing, aptitude scores may be somewhat influenced by the school a pupil attends. One might expect aptitude scores to improve in a good school environment. Yet one cannot validly argue that Nova is better than the private schools which, in turn, are better than the public schools because of their relative standings on the aptitude tests. It is entirely possible that public school pupils would have scored lower on the aptitude tests had they attended private schools, and private school pupils higher had they attended public schools.

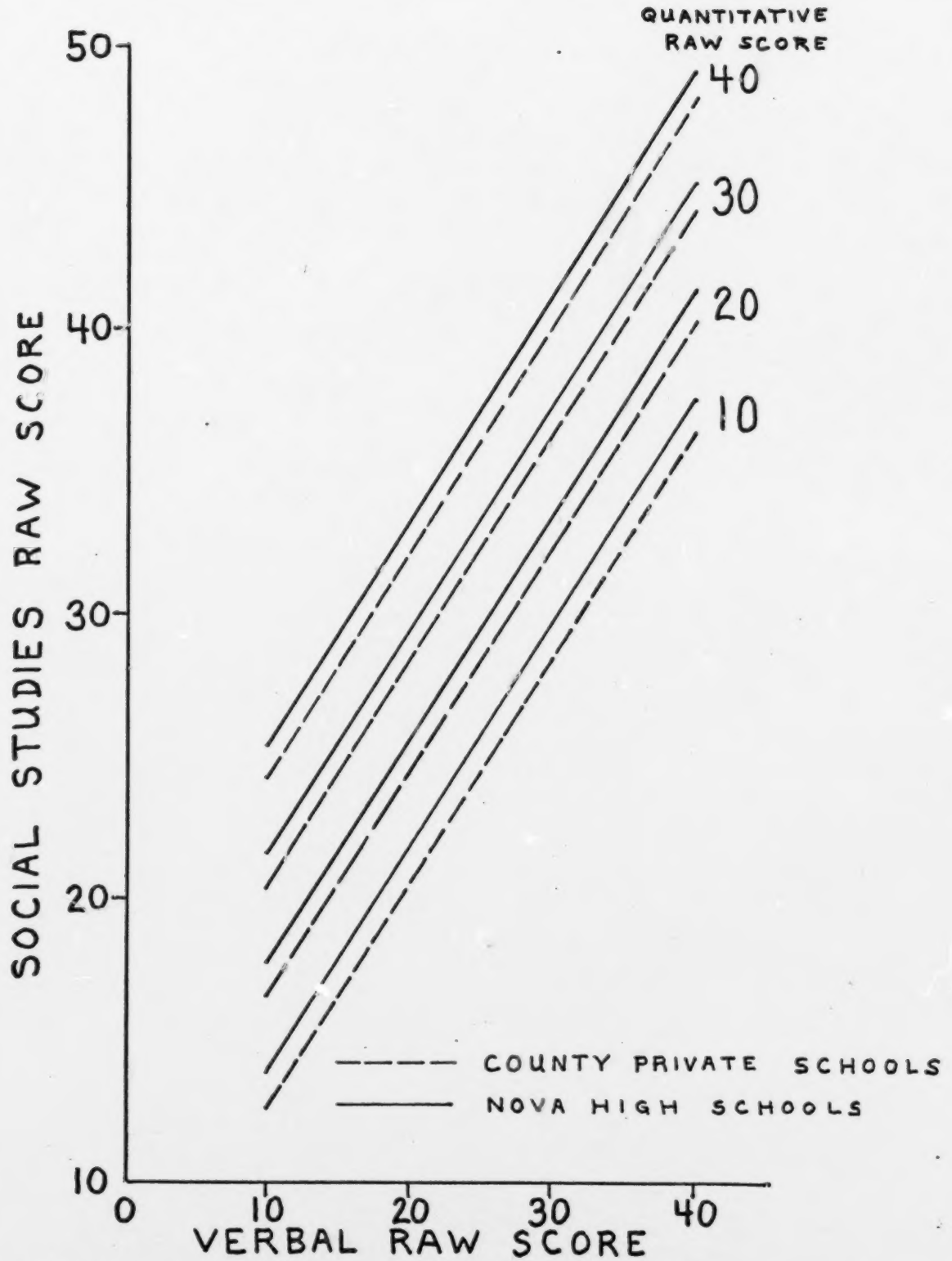
One must simply accept the fact that no one study can provide a completely unambiguous answer to questions of this nature. The information contained in a series of carefully-done investigations such as this can, however, contribute to the development of a more informed perspective upon the productivity of the local school system.

One can conclude from the evidence presented in this report that the achievement of private school seniors in 1970-71 did not seem to differ much from that of public school seniors of like abilities in Broward County.

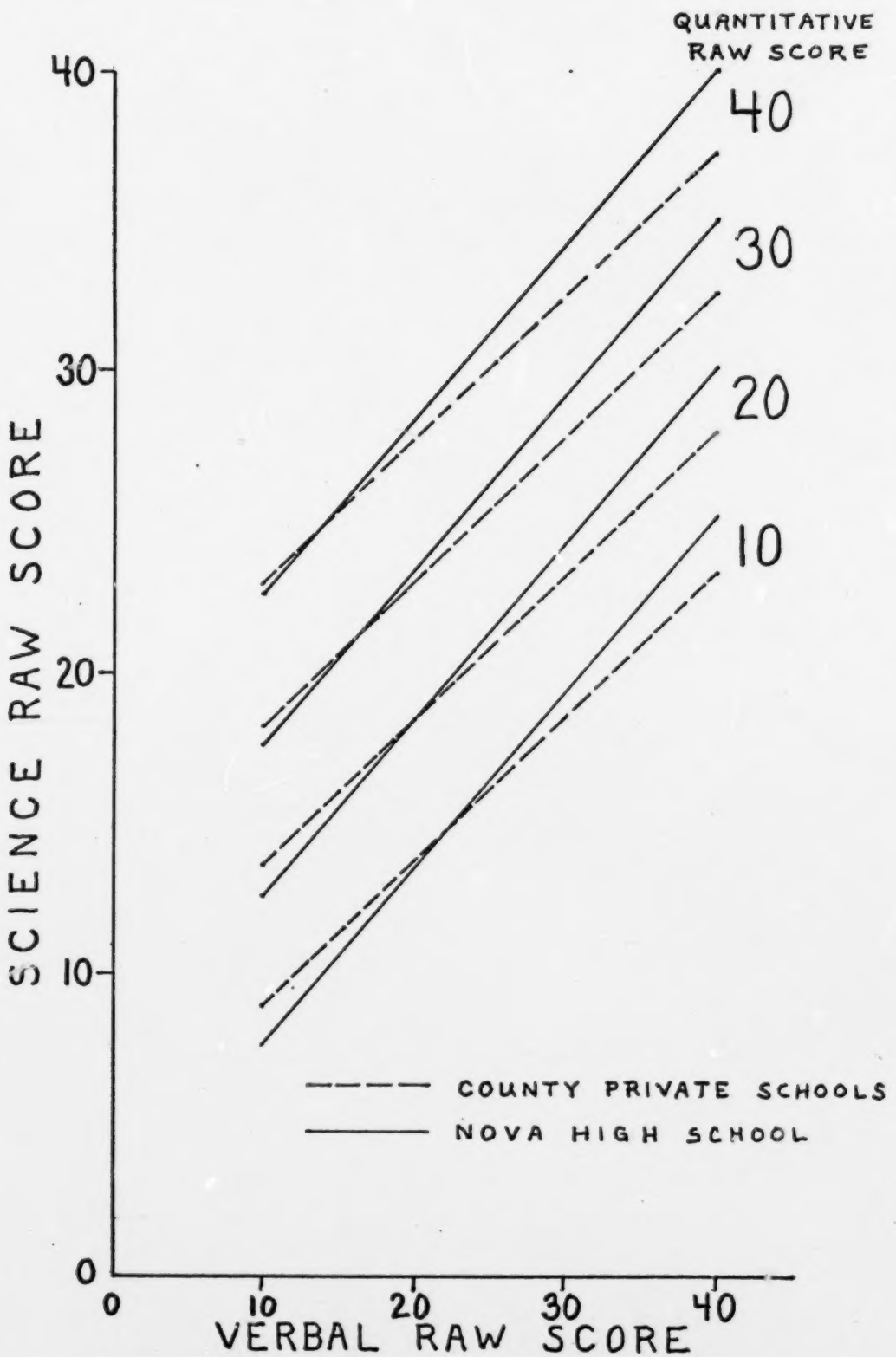
Differences between Nova and the private schools on some of the achievement tests could not be explained solely on the basis of Nova's higher aptitude scores.



1970/71 TWELFTH GRADE STATE-WIDE TEST RESULTS IN ENGLISH ACHIEVEMENT FOR NOVA STUDENTS AND FOR STUDENTS IN BROWARD COUNTY PRIVATE SCHOOLS AS A FUNCTION OF BOTH VERBAL AND QUANTITATIVE APTITUDE.



1970/71 TWELFTH GRADE STATE-WIDE TEST RESULTS IN SOCIAL STUDIES ACHIEVEMENT FOR NOVA STUDENTS AND FOR STUDENTS IN BROWARD COUNTY PRIVATE SCHOOLS AS A FUNCTION OF BOTH VERBAL AND QUANTITATIVE APTITUDE.



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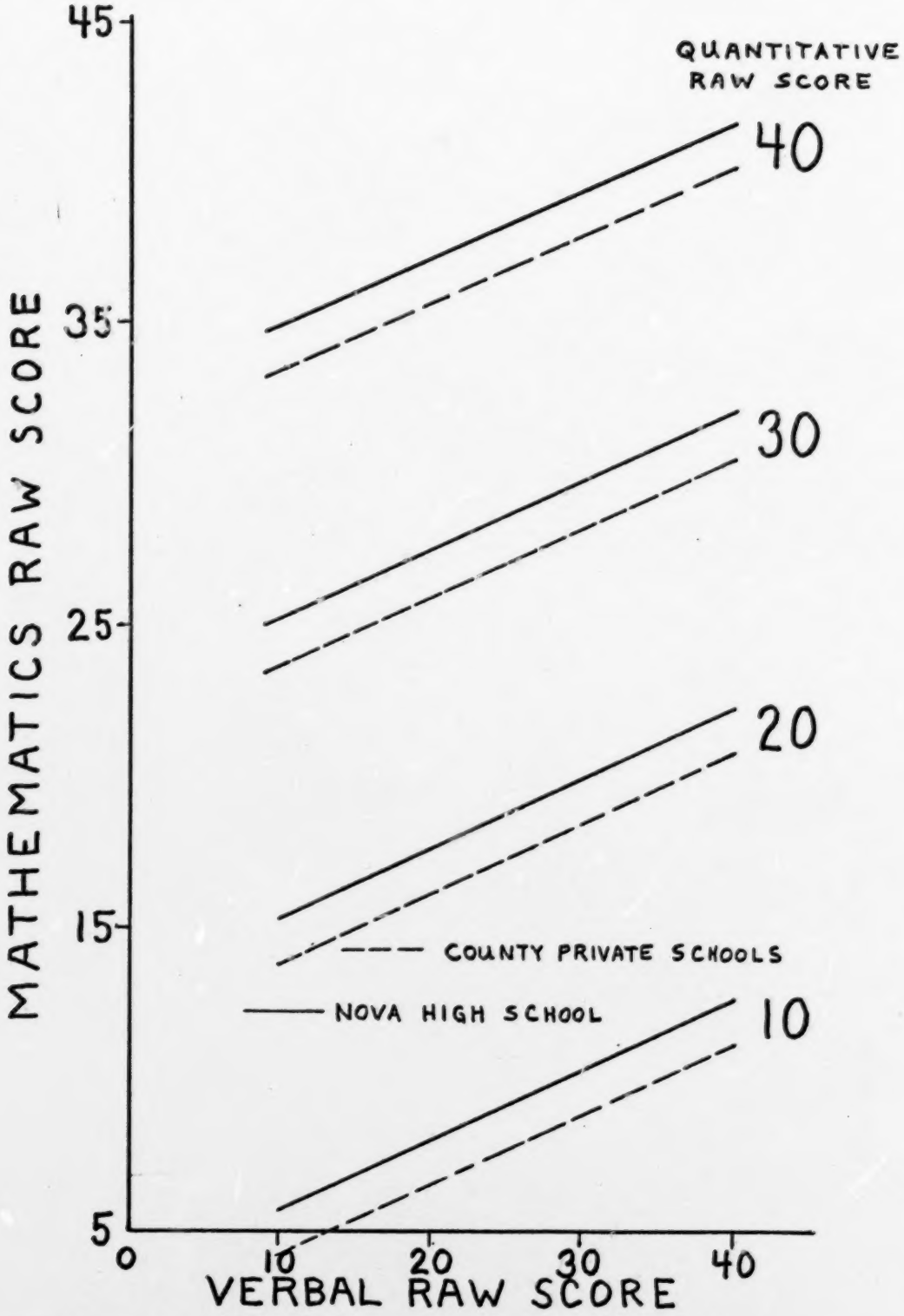
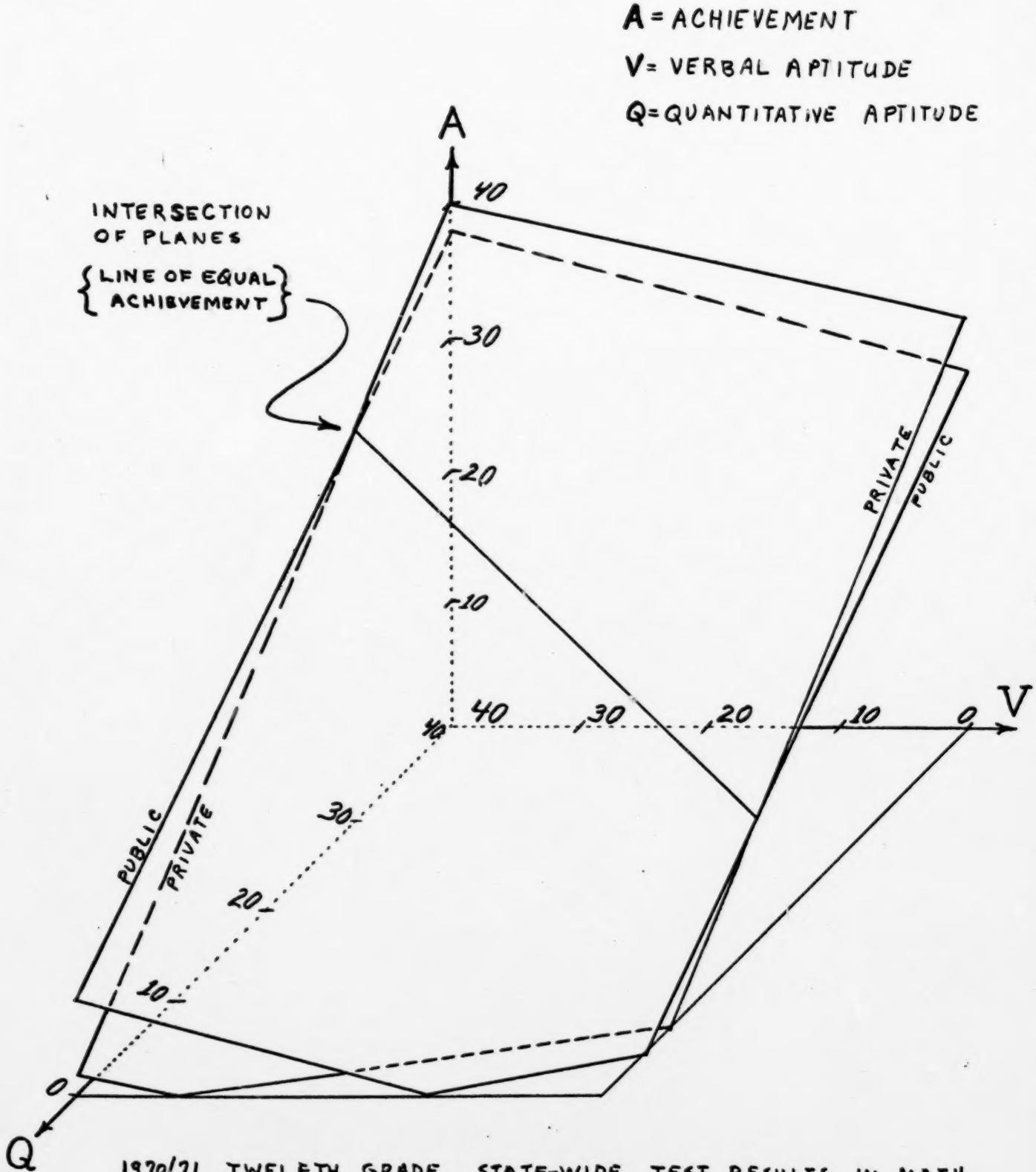


1970/71 TWELFTH GRADE STATE-WIDE TEST RESULTS IN MATHEMATICS ACHIEVEMENT FOR NOVA STUDENTS AND FOR STUDENTS IN BROWARD COUNTY PRIVATE SCHOOLS AS A FUNCTION OF BOTH VERBAL AND QUANTITATIVE APTITUDE.

APPENDIX

The graphs in this report were drawn in two dimensions. This was partly because some readers might have difficulty in interpreting three-dimensional representations. A three-dimensional representation of the differences between public and private schools on the math test has been provided in this appendix. The math test was chosen because interactions between the school groups and the aptitude scores were pronounced on this test. A three-dimensional figure may clarify the nature of these interactions for visually-minded readers.

The figure on the following page illustrates the interactions. Achievement for the public and private schools is expressed as two planar surfaces, one for the public and one for the private schools. The height of the planes for any pair of verbal and quantitative aptitude scores expresses the achievement. The line formed by the insection of the two planes indicates the particular combinations of verbal and quantitative aptitude that lead to equal achievement in the two types of schools. Examination of the figure indicates that the mathematics achievement of students in private schools exceeds that of students in public schools for high levels of quantitative aptitude but that this difference decreases as verbal aptitude increases. On the other hand, students in public schools have higher mathematics achievement than their counterparts in private schools at lower levels of quantitative aptitude, although this difference decreases as verbal aptitude decreases.



1970/71 TWELFTH GRADE STATE-WIDE TEST RESULTS IN MATH FOR STUDENTS IN BROWARD COUNTY PUBLIC AND PRIVATE SCHOOLS AS A FUNCTION OF VERBAL & QUANTITATIVE APTITUDE.